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POLIOMYELITIS AND PUBLIC HEALTH

The development of a vaccine effective against poliomyelitis has excited enormous interest throughout the world, and large-scale vaccination programmes have already been carried through successfully in several countries. The experience gained can obviously be of benefit to public health authorities in other countries who are considering the introduction of vaccination programmes. To facilitate an international exchange of views on the subject, the WHO Expert Committee on Poliomyelitis was convened in July 1957. Certain sections of the recently published report of this Committee dealing especially with public health aspects of the disease, are summarized in the article below.[1]

Epidemiology and vaccination campaigns

Before any country decides to introduce vaccination against poliomyelitis it must weigh the importance of its poliomyelitis problem against other urgent public health needs and judge what proportion of its resources can be made available for a vaccination programme. Its considerations will be influenced by the knowledge that the prevalence and severity of poliomyelitis differ greatly in different regions. In some, it is a disease of infants only; in others it assumes epidemic proportions, attacking both children and adults. Particular attention to the age incidence of paralytic poliomyelitis over the preceding decade will make it possible to determine the age-groups mainly at risk. Having examined past experience, an attempt should then be made to envisage how the situation is likely to develop in the future, particularly in those areas where reported cases have been few and epidemics unknown. However reassuring the situation may appear, vigilance is called for, since in many parts of the world poliomyelitis has recently tended to show a sharp increase in prevalence, sometimes in the form of severe epidemics. This change may be due partly to a general improvement in hygiene and sanitation, partly to the introduction of new and more virulent strains of virus. A fall in infant mortality may be considered as one of the warning signs, for it is common to find that when the infant mortality rate falls below about 75 per 1000 live births, the poliomyelitis rates begin to increase above 3-4 per 100 000. A rise in the incidence of poliomyelitis, especially in epidemic form, may also be heralded by the appearance of cases in older children as well as in infants. If the number of cases occurring in children over 10 years of age increases above 20% of the total, there is every likehood that the disease is increasing in activity. In order to be able to form a clear idea of the situation, it is therefore important to maintain an efficient and accurate system of case reporting.

Reporting and nomenclature of clinical poliomyelitis

The discovery that viruses other than that of poliomyelitis can cause a syndrome of " aseptic meningitis " has given further point to the recommendation put forward by the Third World Health Assembly in 1950 that paralytic cases should be reported separately. A revision in the nomenclature of the various clinical forms of poliomyelitis, as proposed in the report of the Expert Committee, would be desirable. In particular, it is necessary to define what is meant by the term " non-paralytic poliomyelitis ", which has been used indiscriminately in the past to denote a heterogeneous group of non-suppurative varieties of meningo-encephalomyelitis, not always due to viral infections. During

[1] See also page 163 for a general review of the Committee's report.

epidemics of poliomyelitis, as many as 80% of the cases of aseptic meningitis syndrome designated as " non-paralytic poliomyelitis " may, in fact, be found to be caused by the poliovirus, but at other times during the summer the percentage may fall to 5% and the majority of cases be found to be due to other organisms (Coxsackie A and B and ECHO viruses, the viruses of mumps, herpes, and arthropod-borne encephalitis, leptospira, etc.). For this reason, the Committee suggests that the expression " non-paralytic poliomyelitis " should be replaced by the term " aseptic meningitis syndrome (due to... virus) " when the causal agent has been identified by laboratory tests, or by the term " aseptic meningitis syndrome (etiology unknown) " if this is not the case. This syndrome is increasing in importance and large epidemics have already occurred; it is therefore important that cases should be reported. The differential diagnosis of these various clinical forms is difficult without laboratory assistance. The provision of laboratory facilities is therefore indicated in areas where poliomyelitis constitutes a public health problem or is likely to become one.

Selection of subjects for vaccination

It will be necessary to fix priorities within the age-groups for which vaccination is considered desirable. As a rule, first priority will be given to those sub-groups that have shown the highest incidence of paralytic cases, but an exception may be made when a relatively high percentage of cases of severe paralysis occur in other age-groups, for example, in young adults.

Vaccination during epidemics

Emergency vaccination campaigns have been initiated in some areas while an epidemic was in progress, but the advantages and disadvantages of this procedure have not yet been fully assessed. While it is inevitable, under such conditions, that cases of poliomyelitis will be reported within a month of injection, the majority of these are probably cases of natural infection, independent of the immunizing injection. Three other alternatives need consideration, however:

(*a*) provocation of a paralytic attack by the injection, similar to the effect sometimes observed following the injection of various other antigenic materials, particularly those containing alum;

(*b*) a heightened susceptibility lasting for a brief period after the injection, enabling a coincident infection to have a greater paralytic effect;

(*c*) traces of virus may have escaped inactivation.

In general, the advisability of starting a vaccination programme during the course of an epidemic will be decided by local circumstances. In a crowded community that has never been vaccinated the epidemic would probably have passed before the least advantage could be gained from the immunization. On the other hand, where it is a question of preventing the extension of the epidemic to peripheral regions—a process that may take several months—it would seem advisable to institute vaccination on a large scale as early as possible.

Provocation of poliomyelitis

The injection of certain immunizing agents containing alum—for example, absorbed combined vaccines against diphtheria and whooping cough—has been found capable of provoking paralytic poliomyelitis in persons having an asymptomatic, alimentary poliomyelitis infection.[2] The administration of such injections during epidemics of poliomyelitis has consequently been forbidden in many communities. Since it appears that provocation is due to the fact that poliovirus circulating in the blood becomes localized in the segment of the spinal cord corresponding to the site of the injection, the Committee did not consider it likely that such accidents would occur in subjects who had completed a full course of injections of inactivated poliovirus vaccine. There would thus seem to be no reason for withholding vaccination

[2] In this connexion, see also Cockburn, W. C. (1958) *Bull. Wld Hlth Org.*, 19 (in press) and *Chron. Wld Hlth Org.*, 1958, 12, 80.

against other diseases from persons already successfully immunized against poliomyelitis.

Certain observations suggest that tonsillectomies and adenoidectomies increase the risk of bulbar poliomyelitis, probably by direct contamination of the nerves with poliovirus present in the pharynx. These operations have therefore been discouraged or forbidden during the " poliomyelitis season " in many communities. Since it is known that vaccination with inactive virus does not prevent multiplication of the virus in the intestine, it is probable that it does not do so in the pharynx either. Accordingly, the Committee recommended that, until evidence to the contrary is accumulated, it would be advisable to continue the prohibition of tonsillectomies and adenoidectomies during the " poliomyelitis season ".

Serological surveys

Serological surveys may furnish information that will be useful when a decision has to be taken regarding vaccination campaigns. Their intrinsic value is limited, however, and the time, labour and money which such surveys demand are not always justified. As far as possible, preference should be given to simpler procedures. Where reliable health statistics exist, providing data on the paralytic attack rate in different age-groups over a period of one or more decades, a good picture can be obtained of the immunological status of the population. In areas where such data are not available, in island populations or other isolated communities, and during epidemics presenting unusual features, serological surveys are indispensable. However, a knowledge of the immunological state of the population, as revealed by statistics or by serological surveys, does not in itself make it possible to assess the chances of an epidemic's occurring or to gauge the resistance that the population would offer. It is necessary to take into account the virulence of the virus, the amount of virus in circulation in the population, and other still imperfectly understood factors.

The results of some surveys already carried out were examined by the Committee and found to be in harmony with current views on the epidemiology of poliomyelitis. It can be expected, for example, that few cases of paralysis will occur in a community if 80% or more of the population are immune as shown by the presence of poliomyelitis antibody. Nevertheless, the value of serological surveys is severely limited by the fact that the pattern of immunity varies among different socio-economic groups in the same country almost as much as it does among countries in widely different stages of economic development. As a means of assessing the immunological status of a population, serological surveys are, in most cases, a poor substitute for data accumulated by accurate reporting of the paralytic disease.

Role of WHO

During the last few years, the six regional laboratories designated by WHO have had to expand their programmes of activity considerably and have received requests for assistance in many different fields.

Professional training

The Regional Laboratory for Europe has been concerned principally with demands for technical training. Courses in tissue-culture techniques were organized in 1956 and 1957, and a further course will probably be needed in 1958. These training programmes, particularly those for short-term fellows, have imposed a heavy strain, both on the Regional Laboratory for Europe and on the Regional Laboratory for the Americas. A short-term fellow is, in fact, able to contribute very little to the work of the laboratory, whereas a long-term fellow can play his part in the research and routine programmes, which is both to his own advantage and to that of the laboratory. The number of short-term trainees in the regional laboratories will have to be limited—the more so as WHO fellows can find training facilities in other leading virus laboratories.

Serological surveys

Numerous demands have been received by some regional laboratories for assistance

in carrying out serological surveys, and such surveys have been very useful in areas where satisfactory health statistics are not available. The amount of information available on the immunity status of populations in different parts of the world is now so large, however, that serological surveys should only be undertaken with special, well-defined objectives in view.

Supply of materials for diagnostic purposes and research

The demands on the centres for antigens, strains of virus, specific antisera, cells for tissue culture, and tissue-culture media have continually increased and have reached such proportions that it is impossible to satisfy them with existing resources. This is, in fact, part of a wider problem—that of the supply of diagnostic reagents for virus diseases in general. The commercial production of reliable reagents at a reasonable price is a problem that has not yet been solved, and it was recommended that WHO should continue its efforts to find a solution.

Technical advice and epidemiological studies

Advice has been given and studies undertaken by the regional laboratories in connexion with severe epidemics in areas in which poliomyelitis has previously been rare or where there has been a sudden transition from the endemic to the epidemic form. In rendering these services the laboratories are fulfilling one of their essential functions. At the same time, they serve as reference laboratories for confirming analyses and identifying viruses at the request of national laboratories. In order to avoid overlapping, however, the Committee suggested that a single laboratory should be designated in each country which would be responsible for collecting specimens and requests for information and referring them to the regional laboratory.

The study of enteric viruses—a task for the future

International co-operation is essential for the study of virus diseases resembling poliomyelitis but not caused by the poliovirus, as well as for the study of those enteric viruses isolated from the faeces which do not cause poliomyelitis. The Committee therefore suggested that the regional laboratories and other leading laboratories should accept for further identification enteric viruses other than poliovirus responsible for epidemics of aseptic meningitis and other syndromes.

The reasons for the heightened virulence of the poliovirus and its increased ability to spread in man are among the principal unknown factors that prevent a thorough understanding of the poliomyelitis problem. As a means of discovering the characteristics of the virus responsible for these epidemiological features, the study of viruses isolated during severe epidemics would be particularly important, especially in the case of the first serious outbreaks observed in a country. It would be the task of the regional laboratories to arrange for the collection of these viruses in the areas they serve and to make them available on request to the research laboratories. This would apply also to viruses isolated from cases of paralytic disease in vaccinated persons, which might be due either to the emergence of serologically variant strains of poliovirus or to other viruses able to cause paralytic disease.

VENEREAL-DISEASE CONTROL IN THE WESTERN PACIFIC *

The first international venereal-disease control seminar ever to be organized by WHO in the Western Pacific Region took place in Tokyo, Japan, from 17 to 29 March 1958. There were 20 participants from 11 countries or territories within the Region (Australia, Cambodia, French Settlements in Oceania, Hong Kong, Japan, Korea, Laos, Philippines, Singapore, Taiwan and Vietnam), in addition to WHO consultants and staff.

The seminar was officially opened by the Hon. Mr Kenzo Horiki, Ministry of Health and Welfare for Japan; Dr M. Yamaguchi, Director of the Bureau of Public Health of Japan, was elected President.

Nature and extent of the problem

The Western Pacific Region covers a wide area stretching nearly from the Arctic to the Antarctic, including many islands, archipelagos and peninsulas, and embracing a diversity of languages, customs, religions and cultures. The approach to the problems of venereal-disease control must therefore vary from place to place within the Region.

The first part of the seminar consisted of a discussion of reports from 11 countries and territories on the nature and extent of the venereal diseases in the Western Pacific Region. The statistics presented were based mainly on the numbers of new cases attending the governmental clinics and dispensaries. Their value therefore depended upon the adequacy of existing facilities, accuracy of diagnosis (especially in cases of genital ulcer), and conscientiousness in reporting. It was recognized, however, that, where notification procedures are well established, statistics of of this type are a useful guide to the incidence of the venereal diseases. Total venereal-disease rates based on clinical incidence varied widely in the reports discussed, ranging from 160 per 100 000 population in Japan to 870 per 100 000 in Singapore.

Other indices used to assess the extent of the problem included data on the prevalence of sero-reactivity in pregnant women and in certain population groups (armed forces, seafarers, entertainers, city employees, etc.). Such data are influenced by the quality, type and number of serum tests used, by the age-groups of the population tested and by selection factors in the material, and have only a limited value in areas where an endemic treponematosis, e.g., yaws, is present. The value of the data presented on neonatal mortality and death rates due to syphilis was likewise dependent on accuracy of diagnosis and reporting.

Notwithstanding the limitations of the reported data, it was evident that the prevalence of syphilis has declined in several areas of the Region over the last ten years, and that the disease is considered in some countries to be of less public health significance than previously, although it remains important in others. Examples of non-venereally acquired syphilis in children ("endemic syphilis") were reported from the islands of the South Pacific, while endemic yaws is prevalent in Cambodia, Laos, Malaya, the Pacific islands and the Philippines. The downward trend of syphilis has not, on the other hand, been accompanied by a comparable fall in gonorrhoea, which remains a public health problem in most areas, and in some has shown an upward trend in recent years. In at least one country, non-gonococcal urethritis has become more common than gonorrhoea in the male, though, owing to its confusion with gonorrhoea, its prevalence is difficult to estimate. Chancroid has declined in many countries of the Region. Lymphogranuloma venereum is not uncommon but granuloma inguinale is relatively rare.

It was considered that the available information was insufficient to permit an accurate assessment of the true nature and

* Prepared by Dr R. R. Willcox, Consultant, Venereal Diseases and Treponematoses Section, World Health Organization, Geneva

extent of the venereal diseases in the Western Pacific Region. In Japan, special one-day survey techniques have shown that venereal infections in some areas were six to ten times more frequent than reported data had indicated.

The seminar considered it desirable to obtain further data on the nature and extent of the problem, and recommended that WHO explore, with health administrations in the Western Pacific Region, the possibility of carrying out venereal-disease surveys suited to the widely differing local conditions and circumstances. Such surveys would be helpful in determining the lines along which future control programmes should be planned. It was particularly recommended that antenatal serum-testing for syphilis be applied on the widest possible scale in the countries of the Region, taking into account the limitations of this procedure in areas where endemic treponematosis (yaws) is present. Antenatal serum-testing serves a quadruple function. In addition to providing a useful index of syphilis prevalence, it is a valuable case-finding mechanism in a sexually active group, enables congenital syphilis to be prevented by the administration of penicillin to the women tested, and provides a useful starting point for family contact investigation.

Diagnosis, therapy and control

Syphilis

Diagnosis. For the diagnosis of syphilis, the fundamental procedures are the dark-field examination in cases of genital sore, and serum tests. It was evident that standards of diagnostic procedure vary widely throughout the Region.

Dark-field examination is of particular importance in many countries of the Western Pacific Region where chancroid and other genital sores are relatively common in comparison with syphilis (chancroid was reported to be seven times more common than primary syphilis in Taiwan and four times more common in Laos). If reliance is placed on clinical examination alone, not only are cases of syphilis missed, but cases of chancroid in persons with a positive serology due to late latent syphilis or to yaws are frequently incorrectly diagnosed as primary syphilis, and their treatment with penicillin may be written off as a " failure " when serological reversal fails to occur. The seminar considered that, when possible, dark-field examinations—repeated, if necessary—should be carried out for all cases of genital sore.

Serum-tests are best performed in the laboratory. A few well-equipped laboratories are preferable to several small ones, since they ensure greater uniformity in the methods employed. International reference preparations for cardiolipin and lecithin and dried reactive sera are now available through WHO; the seminar welcomed this development which permits the standardization of local reagents and methods. It recognized that, for the appraisal of penicillin therapy in syphilis, quantitative serological techniques are necessary, and that local serological laboratories should depend on a central reference laboratory, where results can be checked and verified.

The problems created by false positive findings were considered and the newer serological techniques involving treponemal antigens (treponemal immobilization test, treponemal agglutination test and treponemal complement-fixation test) were reviewed. It was agreed that laboratories should not press for these valuable tools until basic national serological services employing the conventional tests have been firmly established. On the other hand, the seminar recognized the continuing need in the Western Pacific Region for an international serological centre, which could be at the disposal of national laboratories and where the newer tests would be available.

Treatment. Long-acting penicillins were agreed to be the preparations of choice for the treatment of syphilis, and the minimal schedules recommended by the WHO Expert Committee on Venereal Infections and Treponematoses were noted.[1] The high initial dosage recommended is important from an epidemiological and public health point of view, since it ensures the rapid

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1953, **63**, 19

control of infectiousness in all cases and cure in a high proportion of them, even when patients fail to return for further treatment. It was remarked that many clinics give dosages in excess of those recommended by the Committee.

The seminar recognized that preparations of PAM [2] should conform with the minimum requirements formulated by WHO so that unnecessary relapses can be avoided and the results of treatment by the brands employed in different countries can be compared.

Gonorrhoea

While the numbers of cases of gonorrhoea in many countries of the world have fallen to as much as 30-50% of the immediate post-war peak, there are now signs not only that the decline has halted, but that the disease is definitely on the increase in certain areas. This trend has been reported outside the Region, in Canada, Denmark, Finland, France, India, Poland, Norway, Sweden, the United Kingdom and the USA. Information presented to the seminar showed that a similar situation exists in Australia, Hong Kong, the Philippines, Singapore and Taiwan. It is evident that gonorrhoea is far from being controlled, and represents a considerable and increasing problem.

Diagnosis. The methods used in the diagnosis of gonorrhoea vary throughout the Region. The importance of distinguishing the disease from non-gonococcal urethritis in males was stressed, since the latter condition is relatively insensitive to penicillin. Thus, in the event of a wrong diagnosis, the failure of the discharge to clear following the use of penicillin might result in an unfair appraisal of the value of this antibiotic in the treatment of gonorrhoea. The value of cultures for diagnosis of the disease, especially in females, and the need for standardized methods were also stressed.

Treatment. Evidence was presented to show that repository penicillins are no longer as effective as they have been in the treatment of gonorrhoea, although it was agreed that complications of the disease are rare. The higher failure rates—up to 30% in some series—have occurred in spite of a gradually increasing dosage.

It appears that the gonococcus is becoming less sensitive to penicillin. It is not known whether this is due to the development of new metabolic processes in the organism (i.e., acquired resistance) or whether—as seems more likely—it is a result of the continued selective breeding of relatively insensitive strains.

Possible ways of dealing with the situation were discussed, and the view was expressed that, even if penicillin is only 70% effective in the treatment of gonorrhoea, it is still an excellent drug for the purpose. The tetracycline and other antibiotics administered orally are too expensive for routine use and, if used on a wide scale over a period of time, might also gradually become less effective. This applies to streptomycin as well.

It was felt, however, that, in order to prevent the gonococcus from developing a lessened sensitivity to penicillin by easy stages, a higher level of penicillinaemia is required than that obtained with doses of up to 1.2 mega units of the long-acting benzathine penicillin or of PAM. The difficulty, if a short-acting preparation is used, would be the loss of the so-called " epidemiological tail " (the prolongation of penicillinaemia for some days during which the contacts may be found and treated before the original patient becomes reinfected). The seminar suggested that the question of the dosage and preparation to be used for the treatment of gonorrhoea be urgently reviewed by the WHO Expert Committee on Venereal Infections and Treponematoses. In the meantime, the continued use of repository penicillins (e.g., PAM) in gonorrhoea would seem to be justified only as long as the cure rates remain acceptable, while in most areas the dose of penicillin, whatever the preparation in current use, might with advantage be substantially increased to prevent further loss of sensitivity.

The importance of research into the apparent lessening of sensitivity in the

[2] Procaine penicillin G in oil with 2% aluminium monostearate

gonococcus was stressed, as was the need for seeking improved methods for the diagnosis of gonorrhoea. The seminar recommended that an international gonococcus centre be established to examine these and similar problems.

Ophthalmia neonatorum. It was noted that ophthalmia neonatorum is encountered in some parts of the Region and that further work in this field, in co-operation with maternal and child health programmes, appears to be necessary.

Non-gonococcal urethritis

In some areas, non-gonococcal urethritis is frequently confused with gonorrhoea. In Japan, it is assuming greater importance than gonorrhoea in the male. Its etiology is unknown and its treatment unsatisfactory ; the tetracycline antibiotics, which apparently give the best results, are very expensive. The seminar considered that further special research in this field is required.

Other venereal diseases

Of the diseases in the chancroid, lymphogranuloma venereum and granuloma venereum group, it was agreed that chancroid is the most important in the Western Pacific Region. Although the incidence of this disease, in relation to that of primary syphilis, was reported to be on the decline in Taiwan, Japan, Hong Kong, the Philippines and Viet Nam, it represents a considerable problem in many areas. This disease by itself is usually amenable to sulfonamides but the diagnostic methods all have their limitations. It was agreed that the most important step in its control is to exclude the possibility of syphilis by darkfield and serum tests, which should be repeated, if necessary. If local conditions preclude the proper exclusion of syphilis, suspected cases of chancroid are best treated with penicillin, administered as for syphilis, with sulfonamides in addition if necessary. It was evident that lymphogranuloma venereum is present throughout the Region, but that in most parts it does not represent a public health problem. Granuloma inguinale is rare (less than 0.1 per 100 000 population in Japan). The high incidence of condylomata acuminata among prostitutes in Taiwan was noted.

Penicillin reactions

Nature and extent

Severe anaphylactic reactions following the use of penicillin have occurred in recent years in many countries, including those of the Western Pacific Region.

Allergic reactions to penicillin are usually related to a previous history of allergy, to the number of injections previously given, to the intervals between them, and to the type of preparation used. They are more common with certain types of penicillin, with quickly absorbed rather than repository preparations, and with any penicillin preparation which has been in use for some time. They appear more frequently after intramuscular administration than after oral administration, and are less common in children, who are likely to be receiving penicillin for the first time.

All the participants were aware of some fatalities due to penicillin. The publicity given to such cases—particularly if the victim is well known in a community—tends to create alarm, and can jeopardize the success of a whole treponematosis-control campaign.

Serious reactions in the course of treatment for venereal disease are, however, extremely rare in relation to the enormous amounts of penicillin used— and in general much rarer than they were in the days when arsenic and bismuth were employed. A recent WHO survey involving some 626 500 patients treated with repository penicillin in 18 countries over a five-year period revealed only 9 deaths—or one in 70 000 cases treated. In Taiwan, which reported the largest number of deaths following the administration of penicillin, only 1 death had occurred in 44 000 cases treated during the WHO-assisted venereal-disease control project. It was stated that this fatal case could probably have been avoided if there had been a known history of previous penicillin allergy. It is

probable that some of the 9 deaths reported in the WHO survey could likewise have been avoided.

The majority of the deaths reported by participants had occurred during private treatment by general practitioners (who use quicker-acting penicillins more frequently). A number of participants stated that, in spite of the many thousands of injections of penicillin for which they had personally been responsible over periods of up to fifteen years, they had not themselves encountered any deaths from penicillin anaphylaxis. Therefore, while the seriousness of allergic reactions to penicillin should not be minimized, fear of such reactions should not be allowed to interfere with the full application of penicillin in treponematosis-control programmes.

Prevention

The seminar recommended that all possible measures be taken to prevent the occurrence of reactions to penicillin by forbidding the sale of the drug except on prescription, and permitting its use only when indicated on recognized clinical and public health grounds. Topical applications of the antibiotic and its use for trivial conditions should be discouraged.

It was felt that many penicillin reactions could probably be avoided by careful history-taking regarding previous allergic reactions, especially to penicillin. The value of skin sensitivity tests was considered to be limited, although they are used in some countries.

Some fatalities could be avoided by having resuscitating drugs available for immediate use, and it was considered that special resuscitating kits should be held in readiness in all centres and surgeries where penicillin is given. A working-party set up by the seminar considered that these kits should contain the following drugs: adrenalin hydrochloride 1 : 1000, nikethamide, an antihistamine preparation for intramuscular injection, and two 2-ml syringes with hypodermic needles. If locally available, a suitable cortisone preparation—to be given intramuscularly or intravenously—and aminophylline (up to 0.5 g) for slow intravenous injection should be provided. It was noted that penicillinase has recently become available commercially and it was felt that this preparation might be useful in the future.

It was recommended that, immediately a patient shows a reaction, he should be laid flat and 0.3 - 1.0 ml (5-15 minims) of adrenalin hydrochloride should be administered in the upper arm, followed by 2.0 ml of nikethamide. If the patient's condition fails to improve, or deteriorates, the adrenalin should be repeated or a suitable cortisone preparation given intramuscularly or intravenously. Other recognized therapy for severe shock should be instituted, and where possible the patient should be admitted to hospital. Intravenous or intramuscular antihistamine preparations should be given in cases of angioneurotic oedema, and 0.5 g of aminophylline intravenously when coughing and respiratory distress are marked.

Venereal-disease prevention and control

Effective venereal-disease prevention and control depend on the availability of free and adequate facilities for diagnosis and treatment. The use of these facilities should be encouraged in the course of case-finding through contact tracing, and health education work among certain groups of the population, particularly expectant mothers. It was noted, however, that in the Western Pacific Region antenatal serum-testing is in many instances limited and that by no means all expectant mothers have the opportunity of receiving antenatal serum-tests.

Maritime aspects

Venereal diseases are often diseases of itinerants, especially seafarers, and therefore constitute a particular problem in seaports, where they are usually linked with prostitution. The mutually protective Brussels Agreement of 1924 (administered by WHO since 1948) [3] provides for free treatment of seamen of all nationalities in port areas. The seminar noted that there are still some countries in the Western Pacific Region and elsewhere which have neither ratified nor

[3] See page 167 of this issue of the Chronicle.

adhered to the Brussels Agreement, and it considered that they should be encouraged to do so, as recommended by WHO in 1954. At the same time it was felt that the addresses and hours of venereal-disease clinics in countries which have not so far adhered to the Brussels Agreement should be included in the *International Directory of Venereal-Disease Treatment Centres at Ports*, a new version of which is now being prepared by WHO.

Prostitution

No country has yet succeeded in suppressing prostitution completely. Social reform has led to the legal abolition of brothels in many countries, and this measure has in the long run tended to reduce the incidence of venereal diseases. The seminar considered that action against prostitution is a social rather than a medical matter, but that the control of the venereal diseases among prostitutes and their consorts is part of the accepted responsibility of health administrations.

It was noted that the situation in certain Western Pacific countries differs from that in many other parts of the world, in so far as 70-90% of venereal-disease cases are reported as being contracted from prostitutes, 12-35% of whom are infected with syphilis or gonorrhoea or both.

The routine medical examination of prostitutes was considered in detail. It was realized that such examinations have their limitations, but cannot be discarded as valueless. The routine prophylaxis of prostitutes with penicillin was also discussed. The evidence indicated that it confers a large measure of protection against syphilis, but the data concerning gonorrhoea were less encouraging. The principal disadvantage appeared to be the possibility of reducing the sensitivity of the gonococcus to penicillin. Moreover, only a relatively small fraction of the prostitute population is usually covered by routine prophylaxis. The difficulty of evaluating the effects of this measure and the need for assembling all available data on the subject, both from the Region and elsewhere, were stressed.

The participants in the seminar were particularly interested in a report from Japan of a new prophylactic procedure which has been tried out over the past few years. This involves the insertion of penicillin or another antibiotic deep into the vagina after vaginal irrigation following the last sexual intercourse each night. Laboratory tests have shown significant concentrations of penicillin in the vaginal fornix, and to a lesser extent at the uterine orifice, 24 hours later. The data presented indicated that by this method the incidence of both gonorrhoea and syphilis in prostitutes might be significantly reduced.

The seminar considered at some length the possible consequences for venereal-disease control of the abolition of brothels. This question was of particular interest to the host country, Japan, where a new Anti-Prostitution Law, making brothels illegal, came into force on 1 April 1958, a few days after the close of the seminar. Experience in other countries has shown that in such circumstances clandestine prostitution tends to increase and a wider outlook on the question of venereal-disease control is necessary.

The first essential, as recommended by the seminar, is the provision of free and confidential treatment which should be easily available to all, and the use of which should be encouraged by health education at all levels. Epidemiological case-finding is also essential, while venereal disease in the community should be uncovered as far as possible by screening procedures (e.g., antenatal blood-testing and the blood-testing of special groups).

PROBLEMS AND PROSPECTS OF MALARIA CONTROL IN WEST AFRICA

In the tropical areas of West Africa, the intensity of malaria transmission is probably greater than anywhere else in the world. Consequently, more efficient methods have to be adopted to break the cycle of transmission. Attention has recently been drawn to new problems which increase the complexity of malaria control in the area. These include resistance of the vectors to insecticides; resistance of the malaria parasite to pyrimethamine; sorption of the insecticides on mud walls; and outdoor resting habits (exophily) of the vectors, enabling them to escape the action of the insecticides.

Faced with these difficulties and with the failure of many of the malaria control projects in the area, the WHO Regional Office for Africa called together a technical conference at Brazzaville, from 19 to 22 November 1957, to enquire into the reasons for the failures and to consider ways of improving the efficiency of the measures employed. The conference was attended by malariologists and entomologists from all parts of West Africa, as well as by members of the WHO staff and representatives of the US International Co-operation Administration and UNICEF. The following is a summary of the discussions.[1]

Importance of environment

As a preliminary to the main debates, the participants reported on the progress of malaria control in the various territories represented. The differences revealed were highly informative. In the South Cameroons, for example, the vectors have disappeared completely from human habitations and in many areas it appears that transmission has been interrupted. On the other hand, in the Upper Volta infected *Anopheles* have been found throughout the sprayed area and no significant difference has been observed between the larval populations of sprayed and unsprayed areas. The explanation of this contrasting behaviour is twofold :

(i) The South Cameroons is mainly forest land whereas the Upper Volta is a savannah area with scattered trees and shrubs.

(ii) The inhabitants of the South Cameroons spend the whole year in the same huts, sleep inside at all seasons, and retire early at night; in the Upper Volta the inhabitants live in " crop huts " away from the village during the planting and harvest season, and they sleep outside their houses for part of the night, especially during the dry season.

In both areas, the vectors—of which *A. gambiae* is the most important—are anthropophilic and bite for preference indoors, but they also bite readily in the open at night. In the South Cameroons, however, the habits of the population deny them this possibility, and the scarcity of domestic and wild animals means that there is practically no alternative source of food. In the Upper Volta, the mosquitos are able to feed outside at night, and there are also large numbers of domestic and wild animals. The fact that, during the season of maximal transmission, the inhabitants live in " crop huts ", which are often only temporary buildings, also increases the difficulties of control. Added to this, the savannah-like nature of the Upper Volta, with several large rivers and many marshes and temporary pools during the rainy season, offers plenty of favourable breeding places for the mosquitos away from the treated areas. *A. gambiae*, in particular, prefers sunlit water and for this reason is able to breed in the South Cameroons only in the vicinity of the villages where the forest has been cleared.

Similar conditions to those in the Upper Volta are found in the savannah country of the North Cameroons, where little progress

[1] Based on unpublished working document WHO/Mal/196

has been achieved. Results have also been disappointing in Liberia, where the majority of the population lives in remote, scattered dwellings, and in Togoland where the spraying teams had difficulty in gaining access to many buildings, especially to fetish huts ; in both territories the population spends the agricultural season, which coincides with the peak of malaria transmission, in " crop huts ". On the other hand, substantial control of the vectors has been achieved in Senegal and Northern Nigeria, where malaria rates have been greatly reduced ; interruption of transmission has not yet been achieved, however, although insecticide-spraying has been carried out since 1953 and 1954 respectively.

These differences emphasize the important influence that the ecological environment and the way of life of the population may have on the outcome of spraying operations.

Spraying campaigns

Shortage of funds has led to the practice in some territories of using long-acting insecticides and of disbanding the labour force at the end of each season in order to reduce the costs of the project. This practice was strongly criticized by participants in the conference; once an experienced team has been built up, it should be kept in existence from year to year.

To ensure maximum efficiency, strict supervision of the work of spray teams is necessary. While this can usually be achieved in highly populated areas where the project staff work together in groups of considerable size, it is much more difficult to realize in areas where small spray groups operate over a wide area. Good personnel to act as squad leaders are difficult to find in West Africa; it is therefore important that the duties of these men should be carefully planned so that the best possible use is made of them. Suggestions on methods and techniques for the training of spraymen using compression sprayers are included as an annex to the report; the preparation of a similar guide to the training of supervisory staff is in hand.

Another annex to the report shows specimens of the WHO forms for reporting spraying operations. These forms, which are designed to include only essential data, have already proved their value in different parts of the world, and their adoption in West Africa was recommended by the conference.

When carrying out spraying, it is important to ensure that an effective dose of insecticide is deposited on all surfaces within a house, including the furniture as well as the walls, ceilings, and roof. It was agreed that all outhouses and the house eaves should also be sprayed. There is a need for field research to determine the most effective method of spraying high ceilings and the apex of cone-shaped roofs. In some territories, double roofs present an additional complication. A demonstration of spray pumps was given to the conference, and the advantages and disadvantages of the different types in common use were discussed. Some recommendations concerning the purchase and maintenance of spraying equipment are given in an annex to the report.

The success of a spraying campaign is dependent, among other factors, on the availability of adequate transport in good running order. It was considered that, while drivers in West Africa should be instructed in simple daily maintenance, they should not be expected to carry out repairs in the field. In large control campaigns, a mobile repair truck with a competent staff could serve a number of spraying teams and effect field repairs of considerable magnitude. For major repairs, however, vehicles should be returned to a well-equipped and adequately staffed main base. When purchasing vehicles consideration should be given to the availability of spare parts in the territory in which they would operate.

Choice of insecticide

In view of the development of resistance to dieldrin and BHC in several of the territories, the conference recommended that neither of these insecticides should be used in new projects in West Africa, unless their use was justified by special circumstances. Generally speaking, the choice of insecticide should be governed by the presence or absence of resistance. When resistance develops, a

change of insecticide is often a matter of urgency, and it was therefore suggested that a central depot, holding stocks of an alternative insecticide, should be created to serve a group of territories. If no calls were made on these emergency stocks in any one year, they should be distributed to territories using the insecticide concerned and replaced by fresh supplies. It was requested that UNICEF should considerer participation in such a scheme in the future.

Pilot testing zones

The evidence presented to the conference shows that more than three years of spraying with various residual insecticides in West Africa has not succeeded in preventing the occurrence of new malaria infections, except perhaps at high altitudes and in some forest areas of the South Cameroons. These results clearly indicate the need for instituting an adequate programme of research, both before and during the application of control measures. Great emphasis was laid on the importance of creating pilot testing zones which would serve to test different methods and form the basis for the planning of the main scheme. Such pilot projects would have to be flexible in order to answer the question " How can malaria transmission be interrupted under local conditions ? " They would give early warning of the failure of any method, and would indicate any modifications that might be required in the main project. The questions which need urgent study include: rate of inactivation of insecticide on sprayed surfaces; behaviour of the vector in relation to sprayed houses (observations should be made in sprayed and unsprayed experimental huts); and periodic assessment of the degree of susceptibility of the vectors to the insecticide. In some areas, the possibility that " secondary vectors " may be an important cause of transmission also needs investigation. Where staff and facilities are adequate, it would be useful to study the effect of insecticide applications on the age composition of *A. gambiae* and such changes as selection of resistance or enhancement of vigour. The conference discussed the setting up and duties of an entomological survey team, and outlined a minimum programme of research. It was emphasized that no amount of intensified research after spraying had started could ever replace a lack of pre-control data.

Mass chemoprophylaxis

In territories where the interruption of malaria transmission could not be achieved by house-spraying of residual insecticides alone, there is hope of achieving malaria eradication by a combination of insecticide control with an auxiliary measure, such as mass treatment of the population with antimalaria drugs. In certain of the pilot testing zones, groups of not less than 20 000 persons should be submitted to mass drug treatment, at first with and later without insecticide protection. The drugs to be tried are pyrimethamine and chloroquine, or possibly a combination of the two. Some preliminary results in Nigeria, Senegal and Gambia were reported to the conference. Although it is still too early to make a proper assessment of these trials, the results appear, on the whole, to be encouraging. Much work remains to be done, however, to determine the best methods of administration and the amount of supervision required in West African territories. Pinotti's method of distributing the drug in a universally consumed foodstuff, such as salt, offers one possibility. In certain areas of West Africa, salt is supplied from many sources, and it was suggested that any attempt to replace these many sources by a single one would be likely to arouse the mistrust of the inhabitants. Funds have already been set aside by WHO, however, for a trial to be carried out to determine whether Pinotti's method could be successfully applied in West Africa.

The final goal : eradication

Although in the light of present knowledge, it is not possible to contemplate malaria eradication in West Africa, the conference believed that the time would eventually come when it would be necessary to make plans to

link up with eradication schemes elsewhere in the continent. Progress in this direction could only be achieved by intensified research, co-ordination of effort, and free exchange of information among West African territories. The conference stressed the value of periodic meetings of research workers and field staff, the award of travelling fellowships, and assistance in the training of auxiliary staff. It was recommended that the relevant authorities should consider whether the introduction of special malaria legislation might increase the efficiency of control, especially in territories where operations are hampered by lack of co-operation on the part of the local population. Finally, the conference recommended that the provision of staff, laboratory facilities, equipment, and transport should be on a much greater scale than is regarded as normal in other regions, and that the use of these facilities should be strictly confined to investigations bearing on the two main problems of man-mosquito and mosquito-toxicant interaction.

ERADICATION OF ONCHOCERCIASIS VECTOR FROM KENYA

The virtual eradication of *Simulium neavei*, the vector of onchocerciasis in Kenya, is reported in a paper by J. P. McMahon, R. B. Highton and H. Goiny, which will shortly be published in the *Bulletin of the World Health Organization*. This has been made possible by the discovery in 1950 that the early stages of *S. neavei* are always found attached to the freshwater crab *Potamonautes niloticus* in what appears to be phoretic association.[1] The larvae attach themselves to the eye stalks, mouth parts, bases of the legs and dorsum of the carapace and probably share the food torn up by the crab. Thus the crab plays an important part in maintaining the life cycle of the fly. Earlier larviciding campaigns with DDT had failed because large numbers of streams in forested areas where the adult flies had been captured did not harbour the earlier stages and, still more important, larvae were present in rivers that were outside the forests and had not been treated. Once the crab-larvae association had been established, crab hunts were organized in the affected areas, and in this way all the breeding places were successfully mapped out.

Simulium surveys

Before the larviciding campaigns could be commenced, it was necessary to carry out systematic surveys of the whole of Nyanza Province, an area of some 14 000 square miles (onchocerciasis is not found in other parts of Kenya). Careful planning enabled much time and money to be saved, but nevertheless the operation took nearly three years to complete. Each of the teams employed on the surveys travelled some 3000 miles per year on foot, in addition to approximately 15 000 miles by road. In some areas, local labour had to be employed to cut paths through very dense bush, and in the Kaimosi forest it was necessary to cut about 400 miles of paths, an operation which slowed down progress considerably.

Larvae and adult searches were usually conducted simultaneously, but once the limits of the focus had been established, the search for breeding grounds was intensified and became the main objective. Local youths, stationed about 50 yards apart in shady spots near the river's edge, were used as bait to attract adult flies. Catches were continued for a quarter of an hour and the team then moved on to the next point about 300-400 yards away. Various data relating to the catches were recorded by the team leaders, and on return to camp in the evening the flies were identified and counted, and the density calculated.

For the crab hunts, designed to find the breeding places of the larvae, two types of trap were used—the box trap for shallow water and the bait trap for deep water. The

[1] Van Someren, V. D. & McMahon, J. P. (1950) *Nature*, 166, 350

box trap was open at one end, while the other end and the four sides were covered with wire netting of a mesh fine enough to retain any crabs that entered. It was held down by means of a pole while other members of the team disturbed the bed of the stream. The trap was then lifted quickly and the crabs removed. The bait trap consisted simply of a circular tray of wire netting with a hook in the centre for bait. It was weighted to make it sink but was attached to a cork float. After about 20 minutes it was hauled out of the water with a quick swinging movement before the crabs had time to jump clear. Any larvae and pupae attached to the crabs were collected in tubes for subsequent identification and all relevant data recorded. Later a master map was prepared showing crab and *S. neavei* breeding places.

Larviciding campaigns

Owing to the fact that *S. neavei* is found along densely wooded rivers and streams, it is difficult, if not impossible, to attack the adults by spraying imagocide, particularly in the more extensive forests. Reliance had therefore to be placed entirely on the use of larvicides. A larviciding campaign usually lasted three months and was generally carried out in nine cycles, each of ten days' duration.[2] Here again great attention was given to careful planning, in order to ensure that every infested stream and river was treated once in every cycle. The discharge of each of the rivers at the time of year of the operations was first determined. The total discharge was then doubled to allow for dosing tributaries, and from this figure the amount of insecticide needed was calculated. As a rule, a concentration of 0.5 to 1 p.p.m. (parts per million) was aimed at and 18% DDT in miscible oil was used. A margin of 25% was allowed to make certain that stocks of insecticide would be adequate, as the missing of only one cycle would have led to failure. The ideal time for commencing the campaigns was found to be two to three weeks before the end of the rainy season, as the rivers then remained reasonably high throughout the subsequent period, but the amount of DDT required was not as great as it would have been had the campaigns been commenced earlier. After each dosing had been completed, checking units were sent to pre-selected catching points to make larval searches, and if necessary the stream was re-dosed at a point above the site of infestation.

" Refugee " crabs

Experiments were also made to observe the effects of larger doses of DDT on the crabs, as it was thought that if the crabs could be killed by a single massive dose the campaign could be considerably shortened. The method proved to be unsatisfactory, however, as doses large enough to kill the crabs had a very deleterious effect on fish life. Moreover, many of the crabs were seen to leave the stream and return later when the insecticide had passed downstream. Even at lower concentrations, these " refugee " crabs can render the campaigns a failure by reinfesting treated rivers, and it was found that the concentration of DDT must be below 4 p.p.m. to ensure a tranquil crab population and no harm to the fish. In certain trout streams, concentrations of only 0.1 p.p.m. were used and fish barriers were built to prevent starving fish passing downstream to points from which they could not return.

Results

By January 1953, *S. neavei* had been eliminated from all previously infested areas in South Nyanza. These included the large Kericho/Kuja focus as well as two smaller ones, Riana and Kodera, which had been dealt with in 1942 and 1946 respectively.

In North Nyanza the larviciding campaigns were completed at the end of December 1954. Adult catches and searches for the earlier stages remained negative until December 1955, when the upper reaches of the Yala river were found to be infested. As all other rivers were still free, a modified dosing scheme

[2] During one campaign seven cycles of four days were used, but this did not prove entirely satisfactory.

was put into operation in February 1956, confined solely to the Yala and its tributaries. Since then this area had also remained free from *S. neavei*. The failure of the earlier campaign in 1954 may have been due to the fact that a 14-day dosing cycle was used, in the belief that the larval stage lasted at least 16 days. This assumption, although supported by experimental evidence, may have been incorrect, and in the second campaign the 10-day cycle was used. One very small area of Kenya still remains infested along the south-western flank of Mount Elgon. This is part of a much larger focus situated in Uganda, and the Uganda medical authorities have undertaken the disinfestation of the whole area. There is therefore good reason to hope that *S. neavei* will have been completely eradicated from Kenya in the very near future.

OPPORTUNITIES FOR NURSES IN INTERNATIONAL HEALTH WORK *

No public health service can function effectively unless properly qualified nurses are available in sufficient numbers. For this reason, WHO has always laid great emphasis on the recruitment and training of nurses. The need in many countries is still great, and for a nurse with suitable qualifications a WHO assignment can offer rare opportunities of service under new and often exciting conditions. Some idea of these opportunities and the qualifications required is given in the article below.

To be in at the beginning, to help build something new, is always an exciting and satisfying experience. If this "something new" is a service to alleviate human suffering, the experience is all the more rewarding. Probably few nurses realize that through WHO there are opportunities for them to participate in building up such a service. In Egypt, for example, WHO is helping to strengthen the faculty at the Higher Institute of Nursing, University of Alexandria, which prepares nursing leaders for the Eastern Mediterranean Region. At present, five WHO nurses are assigned to this programme, and it is planned to increase the team to nine. One of the vacant posts is for the team leader, a position corresponding to Dean of the nursing school. Egyptian nurses have taken an active part in the programme from the beginning, and the ultimate aim is that the Institute should be staffed entirely by local, qualified nurse instructors. By then, a firm foundation will have been laid on which to build up the work of this new educational centre for nurses, and the mission of WHO will have been completed.

Another example comes from the Sudan, where, with the help of three WHO nurse educators, the Government has started a new college of nursing at Khartoum. There is a vacancy for a nurse to undertake preclinical teaching, and next year another instructor in medical and surgical nursing will be required.

But it is not only in the Mediterranean countries that such opportunities are to be found; in the Western Pacific and South-East Asia Regions the nursing services are also undergoing rapid expansion. A new university school of nursing, recently opened in Taiwan, needs a nurse educator qualified in obstetric and paediatric nursing and another to teach general nursing. In Afghanistan, a new school for male nurses has been opened in Kabul. With the help of the WHO nursing education team, which includes two male nurse tutors, an Afghan male nurse is being prepared for the position of Director of Nursing Service in the hospital

* Based on an article by Elizabeth Hill, WHO Nursing Section, published in *The Canadian Nurse* 1958, 54, 103

where the male students receive part of their clinical experience. WHO is also helping in the training of female nurses, midwives, and auxiliary health personnel in Afghanistan. The Government of India is anxious that public health training should be integrated into basic nursing education. Public health nurses, with experience in teaching and supervision, are being assigned by WHO to schools of nursing in Madras, Nagpur and one other town to be selected.

Assignments such as these present a far greater challenge than an ordinary nursing appointment, and the rewards, both personal and professional, are correspondingly richer. For the same reason, the qualifications demanded must go beyond a good education in nursing and several years' experience. First, since the main purpose of WHO teams is nursing education, the nurses sent on these assignments should have teaching qualifications and successful experience as teachers. For many of the posts, qualifications in special branches of nursing, such as midwifery, paediatrics, public health, mental health, or nursing service administration, are required as well. It is useful, too, for the nurse undertaking an international assignment to know something of current trends in nursing, experimental programmes and research, to be familiar with the functions of the nursing organizations, and to understand nursing legislation. She should, if possible, have a working knowledge of the language of the country to which she is assigned, or at least of a language that is generally understood there. But this is not all. To be suited for an international assignment, a nurse must have the right type of personality; she must be adaptable and capable of working as a member of a team, and as time goes on she should be able to assume increasing responsibility. A knowledge of the ethnic groups in her own country and of her own culture will help her to understand the cultures and the problems of other countries. This will enable her to work with the people of the country rather than at them, respecting their beliefs and traditions while at the same time imparting to them modern precepts of good nursing practice. All the time she is teaching she will be learning too—learning how to improve her didactic methods and her relations with others. This experience will stand her in good stead when she again returns to her own country.

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There are already 155 WHO nurses serving in 44 countries, but more are needed. In addition to nurse educators, a number of senior nurse consultants are also required for public health work. Any nurse with the necessary qualifications who is interested in making a contribution to international health should apply to: Personnel Section, World Health Organization, Palais des Nations, Geneva.

Reports of Expert Groups

FOUR YEARS OF POLIOMYELITIS RESEARCH

The second report of the WHO Expert Committee on Poliomyelitis has just appeared.[1] During the four years which have elapsed since the publication of the first report, research has made great strides: new methods and new concepts have followed rapidly on one another, and increased experience has been gained in various fields. Immunization using inactivated virus is being widely used in many countries, and promising progress has been made towards the preparation of an attenuated live virus

[1] WHO Expert Committee on Poliomyelitis (1958) *Second report (Wld Hlth Org. techn. Rep. Ser.*, No. 145), 83 pages. Price: 3/6, $0.60, Sw. fr. 2.—. Also published in French and Spanish.

vaccine. The discovery of enteric viruses, resembling in some ways the viruses of poliomyelitis, has proved to be of considerable importance. These viruses, the presence of which may complicate the diagnosis of poliomyelitis, do not generally cause paralysis in man, but are responsible for a number of conditions which in infants are sometimes fatal.

The various aspects of the poliomyelitis problem which concern the public health administrator, the epidemiologist and the laboratory worker are examined in the recent report of the Expert Committee, and the findings are briefly summarized below. Considerations and recommendations of particular interest to health authorities and relating more especially to the epidemiology of the disease are discussed in more detail on page 147 of this number of the Chronicle.

In several parts of the world a considerable increase in the frequency of paralytic cases, sometimes reaching epidemic proportions, has been reported during the last three years, particularly in areas where this form of the disease has not previously been a serious problem. It is to be feared that this change is a prelude to more widespread and perhaps more serious epidemics. In other countries, on the contrary, the position has improved, frequently in association with mass immunization employing the inactivated virus vaccine.

Results of national vaccination programmes

Since 1955, the inactivated vaccine has been used to an increasing extent in many parts of the world. Large-scale vaccination campaigns have been carried out in the United States, Canada, Australia, the Union of South Africa, Denmark, Israel and Sweden. The results of several of these campaigns and the conclusions that can be drawn from them are discussed in the report. Thus, in the United States,where more than 70 000 000 doses of vaccine were administered in 1956, the reduction in paralytic cases is estimated to be 73 %. In the United Kingdom, the Medical Research Council, assessing the results of a trial carried out in 1956, concluded that the incidence of paralytic poliomyelitis in vaccinated persons was only about one-fifth of that in persons who were not vaccinated. In the Union of South Africa, there was a serious epidemic in 1956/1957 which, unlike previous ones, affected Africans with the same frequency as the European population; the reduction in the incidence of paralysis among vaccinated children was of the same order as in the United States. It was found that the administration of a single dose of vaccine is not sufficient to stop infection during an epidemic period, nor does vaccination prevent the dissemination of the virus in the community. In Australia, where the frequency of the disease remained stationary from 1949 to 1955, there was an almost 90% reduction in incidence during the 1956-1957 season and it was believed that much of this could be attributed to vaccination. Elsewhere, because of the small number of cases, valid assessment of the results has not been possible. Secondary reactions have everywhere been uncommon and of little importance.

Inactivated vaccine

The mechanism by which formol inactivates the virus is not yet completely understood.[2] The action of formaldehyde may either result in complete inactivation of the virus, rendering it unable to multiply and to destroy tissue-culture cells (loss of cytopathogenic effect), or bring about certain lesser changes which slow down its cytopathogenic action. In the latter case, when the residual activity of the vaccine is assayed by observing its cytopathogenic action in tissue cultures, some still active virus particles may escape detection if the period of observation is relatively short. There is therefore a danger that a vaccine may be regarded as free from active virus although still containing particles the activity of which, having been greatly reduced by the formaldehyde, can be detected only after long observation. The discrepancies in the results of residual virus activity tests carried out in different laboratories may be partly explained by the fact that the

[2] See in this connexion the article by S. Gard (1957) *Bull. Wld Hlth Org.*, 17, 979.

cultures were observed for different lengths of time.

Furthermore, inactivation is not a first-order chemical reaction proceeding at a constant rate, as was at first thought. Inactivation proceeds at a continuously decreasing rate, and it does not seem that the reaction can be made a first-order one by homogenization of the virus suspension by filtration. Moreover, this procedure has the drawback of appreciably decreasing the immunizing power of the vaccine. Swedish authors consider loss of formaldehyde to be responsible for the inconsistencies observed, and the addition of formol during inactivation has given promising results; this method is being further investigated. French workers have tried to solve this problem by using double inactivation with formaldehyde followed by beta-propiolactone.

Attenuated live vaccine

Vaccine inactivated by formaldehyde protects most subjects against the paralytic form of poliomyelitis. But, as used at present, it is unable to interrupt the circulation of the virus within the community. It does not, in fact, give protection against the primary, alimentary infection and consequently does not overcome the risk of the infection's being spread in the population, owing to the presence of the virus in the stools.

Vaccination with attenuated live vaccine, administered orally, " may provide the only means for eradication of poliomyelitis ", since it confers an immunity comparable to natural immunity, including both humoral immunity and resistance of the intestinal tract to reinfection. This vaccine multiplies for several weeks in the intestinal tract of susceptible children and adults, the titre of antibody produced varying from one individual to another, as in the case of natural infection. Strains derived from a single virus particle—isolated by the plaque method—are used for preparing this vaccine. Strains have been isolated belonging to all three types of poliovirus which are only very slightly neurotropic when injected in large doses into the spinal cord of monkeys and which produce neither paralysis nor lesions when inoculated into the spinal cord of chimpanzees whose susceptibility is more nearly comparable with that of man. When the three types are administered separately—type 1, type 3 and then type 2—at intervals of three weeks, they multiply in the intestinal tract and ensure a good production of the corresponding antibodies and resistance of the alimentary tract to reinfection.

Certain of the early studies carried out with the live virus administered orally [3] showed that the virus excreted in the stools might sometimes be more neurotropic than the one which had been ingested. The extent of the change in neurotropism has been shown to vary considerably according to the strain used, and this is an important criterion in the selection of strains for the vaccine, those which show only a slight increase in activity being preferred. So far, it is true that, whichever strain is used, viruses less attenuated than those administered can be demonstrated in the stools for short periods in a small proportion of persons, but these strains show no tendency to outgrow the more attenuated strains and they are still in the highly attenuated range of the neurotropic spectrum. It is noteworthy that the type 1, 2 and 3 viruses recovered in this way are less neurotropic for the monkey than those which have been isolated from the stools of healthy children during non-epidemic periods.

In these circumstances, the Committee felt that the time has come to carry out trials of attenuated live vaccines under carefully controlled conditions and on an increasing scale, eventually on tens or hundreds of thousands of volunteers, so as to establish on a sufficiently large scale whether the expectations concerning the safety of such vaccines can be confirmed in practice.

Diseases resembling poliomyelitis

A disease can be said to resemble poliomyelitis only when paralysis of the lower motor-neuron type is part of the syndrome. Among infectious diseases at present recognized, only rabies and arthropod-borne

[3] See in this connexion *Chron. Wld Hlth Org.*, 1957, 11, 131.

encephalitis fulfil this requirement. The aseptic meningitis syndrome is often considered to be synonymous with " non-paralytic poliomyelitis ". This is incorrect, as several other infectious agents may be responsible, such as certain Coxsackie A and B viruses, and the viruses of mumps, herpes, lymphocytic choriomeningitis, and arthropod-borne encephalitis, as well as some of those of the ECHO group (enteric cytopathogenic human orphan viruses). Some of these viruses have been isolated from the cerebrospinal fluid of patients and clearly differentiated from poliomyelitis, both in individual cases and during epidemics. The question arises, however, whether the Coxsackie and ECHO viruses cannot produce symptoms resembling those of poliomyelitis, i.e., persistent weakness, paralysis, or encephalitic manifestations, in addition to the aseptic meningitis syndrome. The fact that some of these viruses are able to cause lesions in primate neurons during experimental infections is another reason for investigating this possibility.

Enteric viruses

The large variety of viruses isolated from the human intestinal tract during the last ten years has aroused great interest. Twenty-four antigenic types of Coxsackie virus and 19 types of ECHO virus have been distinguished. Adenoviruses have also been found in the intestinal tract, although they are predominantly inhabitants of the respiratory system. It has been established that certain ECHO viruses are responsible for syndromes such as summer diarrhoea in infants and children, and for certain hospital epidemics among the new-born. The Coxsackie and ECHO viruses resemble the poliomyelitis viruses as regards size, seasonal incidence and epidemiological pattern, and it seems possible that these viruses may all belong to a single group of entero-viruses.

Recommendations for further research

There are many points awaiting further investigation in the various fields briefly described above. The Committee mentioned the following, in particular :

1. Improvement of methods for assessing the antigenic potency of inactivated virus vaccines, making use of guinea-pigs, chicks and other animals considered as non-susceptible to poliomyelitis, as well as of various media *in vitro*.

2. Improvement in the stability of inactivated virus vaccines, in view of the problems of transport, especially in the tropics.

3. Study of neurological, allergic and other complications following the injection of inactivated virus, and comparison with similar complications produced by other forms of vaccination.

4. Effectiveness of combined immunizing agents, e.g., against diphtheria, tetanus, pertussis and poliomyelitis, and the optimum schedule.

5. Comparison of the three techniques in use for virus neutralization tests.

6. Use of the precipitin technique for the rapid diagnosis of poliomyelitis.

7. Application of the complement-fixation test to the diagnosis of poliomyelitis and other enteric virus infections.

8. Means for the laboratory recognition of strains with a strongly paralytogenic behaviour in man. In this connexion, the characteristics of strains isolated during particularly severe epidemics should be examined.

9. Increase in knowledge concerning the safety and efficacy of attenuated live virus vaccines under a variety of field conditions.

10. Importance of enteric viruses as causes of human disease, particularly in infants.

11. Investigation of a number of basic problems in the epidemiology of poliomyelitis using the newer and more accurate techniques.

* * *

The report includes five annexes dealing with the carrying out of laboratory tests and with serological surveys.

MARITIME VENEREAL-DISEASE CONTROL

Public health authorities from five maritime countries, together with members of the secretariats of the International Labour Office and the World Health Organization, met in December 1956 to consider the provisions of the Brussels Agreement of 1924 from the point of view of the health administrator of today. In their report,[1] much of the early history of maritime venereal-disease control is described for the first time ; the original text of the Brussels Agreement and details of its implementation are given in full ; and a bibliography on the health of seafarers is appended.

It has been said that " the seaman does not as a rule contract venereal disease at sea, but on land, and in a port which is not his home ". This comment at once brings out the particularly international character of the threat presented by these diseases, which until comparatively recently constituted a considerable risk for a large group of workers in many countries, with far-reaching consequences for both the public health and the economy. Thirty-five years ago the incidence of venereal diseases was very high; certain governments and international bodies had already contributed much towards providing special treatment facilities for infected seamen, but the decisive step towards international control was taken simultaneously by the International Labour Organization and the Office International d'Hygiène Publique (OIHP) in drafting legislation aimed at making treatment freely available to seafarers on the widest possible scale. In 1921, the Belgian Government took the initiative of proposing the adherence of seafaring nations to a draft Agreement drawn up by the OIHP which was subsequently signed at Brussels by 13 countries in 1924. The Belgian Ministry of Foreign Affairs became the depository for this international instrument, receiving ratifications and accessions as further countries decided to associate themselves with the convention, to which 29 sovereign states and 38 territories now adhere.

From time to time the Agreement has been reviewed by the OIHP, the Health Organisation of the League of Nations, and WHO, and recommendations have been made on its implementation—as, for example, the listing of treatment facilities throughout the world in the *International Directory of Venereal-Disease Treatment Centres at Ports*, the application of the Agreement to the great international river systems, the revision of the Personal Card carried by seamen, and proposals regarding serodiagnosis and therapy. Since the Second World War a general improvement in social conditions and the simplification of treatment resulting from the development of antibiotics have very greatly mitigated the seriousness of maritime venereal disease. Thus it seemed again desirable to reconsider the provisions of legislation which had been drawn up under such different circumstances. As early as 1948, one of the first proccupations of WHO was how the Agreement might be brought up to date technically, and whether it should ultimately be replaced by international health regulations for venereal-disease control. As a basis for these deliberations WHO arranged a number of studies (some in co-operation with the International Union against the Venereal Diseases and Treponematoses) to gather information on the nature, extent and control of venereal infections in ports, at one of which—Rotterdam—a demonstration project was set up with the collaboration of the Netherlands Government. In 1956 the Netherlands National Committee for the Revision of the Brussels Agreement reported that it considered the convention to be " an excellent example of the value of international co-operation in the field of health "; this finding was endorsed by the WHO Study Group which met at the

[1] WHO Study Group on the Agreement of Brussels, 1924, respecting Facilities to be given to Merchant Seamen for the Treatment of Venereal Diseases (1958) *Report* (*Wld Hlth Org. techn. Rep. Ser.*, No. 150), 63 pages. Price: 3/6, $0.60, Sw. fr. 2.—. Also published in French and Spanish.

end of that year to make a detailed examination of the Articles of the Agreement. While recognizing certain shortcomings previously indicated both by the Netherlands Government committee and by the First World Health Assembly in 1948, the Group concluded that it would be inadvisable to attempt to replace the Agreement by another type of international instrument, but that the technical aspects of its provisions should be periodically reviewed by a WHO expert committee and that recommendations on minimum standards of practice under these provisions might be made available to interested governments. It further proposed that the possibility should be explored of establishing a broader international approach to the health problems of seafarers, comprehending prevention, treatment, and rehabilitation in all fields of health. This would call for much preliminary study of present conditions and facilities, and a careful evaluation of the requirements of such an international maritime health service, which might eventually be expected to absorb the provisions of the Brussels Agreement.

Medical education

" The second edition of the *World Directory of Medical Schools* * is a great improvement on the first. Any gaps in the information given in the former edition have now been filled, and some anomalies put right. Moreover, the scope of the present edition has been considerably enlarged, for instead of simple tabulation of details about medical schools, there is now an excellent description of the general educational system and the main features of undergraduate medical education in each country. In addition, useful items such as the population of the country, the ratio of medical graduates to population, and the number of medical graduates per annum have been added. These data are summarized by continent, and world totals are also provided. This is now a unique and most valuable work of reference."

Canadian Medical Association Journal, 1958, **78**, 386

* World Health Organization (1957) *World directory of medical schools*, 2nd edition, revised and enlarged, Geneva, 314 pages. Price: £1 5s., $5.00, or Sw. fr. 15.—.

Notes and News

Operations to be financed from the Malaria Eradication Special Account

At the end of December 1957, malaria eradication was practically achieved in 9 countries or territories, and very far advanced —and even fully achieved for large areas— in 7 other countries or territories. It was being implemented in 44 countries and planned in 16 more. In 63 countries or territories, however, eradication was not yet being planned.

The Eighth World Health Assembly authorized the Director-General of WHO to obtain financial contributions for malaria eradication from governmental and private sources, and established a Malaria Eradication Special Account, to be credited with voluntary contributions received in any usable currency and with the value of contributions in kind. Following the receipt in December 1957 of a voluntary contribution of $5 000 000 from the United States of America, which brought the total amount of contributions up to $5 115 000—sufficient to meet the estimated costs of operations through 1958—it became possible to proceed with the planning of many projects which had been the subject of preliminary negotiations with the governments concerned. The programme of operations planned to be financed from the Malaria Eradication Special Account over the next five years has now been published.[1]

In presenting this programme, the Director-General of WHO points out that the ultimate aim of the policy of malaria eradication is the eradication of the disease from the world. The greatest possible amount of assistance must be given to countries which, without it, would be unable to implement or perhaps to plan a programme. Obviously, countries which have eradicated or are eradicating malaria from their national territories have an interest in their neighbours' doing the same. Assistance is also needed for some countries to accelerate the eradication work on which they have embarked.

It is known that today it is premature to plan eradication from certain areas where economically feasible procedures for the interruption of transmission have not yet been developed. This applies to large areas of tropical Africa and New Guinea, and to limited areas in certain countries, where malaria is transmitted by vectors not amenable to present methods of control by residual insecticides. Nevertheless, for those areas it is important to undertake local investigations with a view to finding an early solution of the problem of how to interrupt transmission.

In many countries where eradication is technically feasible, a period of preparation will be required. This involves the drawing up of a plan and, in some cases, a pre-eradication survey by national or international personnel for a period of about one year before a plan can be developed. But even the best plan of operations, appropriately financed, cannot be implemented if adequately trained personnel are not available. It is therefore a necessity in some countries or territories to provide such training before the actual operations start.

The programme for the next five years has been developed in the light of the foregoing conclusions. The operations which it is planned to finance from the Special Account supplement and do not supplant the assistance which countries receive, or are expected to receive, under the regular budget of the Organization or the Expanded Programme of Technical Assistance. Account has also been taken of the contributions that UNICEF is making and, it is hoped, will continue to make towards malaria eradication.

Activities envisaged in the programme to be financed from the Special Account include: training programmes to meet the great dearth of trained professional staff; laboratory and field research programmes ; a field investigation of surveillance methods ;

[1] *Off. Rec. Wld Hlth Org.*, 81 (Annex 4)

and a study of special techniques for the spraying of tents and temporary shelters and for the periodic administration of drugs to nomad populations in those areas where nomadism is interfering with the development of eradication projects. The direct assistance to national eradication programmes which makes up the greater part of the costs of the planned operations, includes not only international services in the form of personnel, fellowships, supplies and equipment, but also local services. The latter may include, when essential, the provision of funds to governments for the payment or partial payment of salaries of malaria eradication personnel, at the levels established by the country concerned, and the provision of national fellowships. In order that the Organization may give the most effective and expeditious assistance to governments, provision has been made for the necessary increase in staff at Headquarters and in the regions.

Public health planning in Africa

A community's beliefs and practices concerning illness and death are deeply rooted in its cultural history as well as in its present-day way of life. The outstanding problem facing the public health worker in Africa is that of teaching a scientific outlook on the causes and prevention of illness to people who have no ordered, scientific knowledge about human physiology, the spread of disease or the effects of treatment. This problem is stressed by Margaret Read in a study entitled *Social and Cultural Backgrounds for Planning Public Health Programmes in Africa*, recently published by the WHO Regional Office for Africa.[1]

The focus of any public health programme in the rural areas of Africa is inevitably the village. In the case of a campaign against yaws, which has quick and spectacular results, the co-operation of the villagers may be relatively easy to obtain, but difficulties arise when progress is necessarily slow, as, for example, in campaigns against such diseases as malaria, tuberculosis and hookworm. Although the planner and public health worker may be tempted to start operations in those villages where the need is greatest, this is not always the best policy. In general, the most suitable centres for rural health campaigns are villages where signs of progress and the wish to co-operate are already evident.

In rural Africa, as in other tropical and under-developed areas, the "community development" approach, which encourages villagers to help themselves, has proved extremely successful in connexion with public health and similar campaigns. For example, in the Agwu Division, Eastern Nigeria, with a population of 150 000, every village has taken part in some sort of community development project. Thus, over a period of three years, 41 village water-points —rain-water tanks, springs, or wells—were completed; 5 leper villages were established; 5 maternity homes were opened; and 6 villages reconstructed their markets in durable materials. Community development has wrought a tremendous change in the life of the ordinary villager, and change always breeds fresh problems. The people of Agwu can, however, face any new tasks which may come their way with an increased unity and confidence in their ability to carry them out.

Rehabilitation of handicapped children

A joint WHO/UNICEF programme of assistance to the Lebanese Government in establishing a rehabilitation centre for handicapped children was recently brought to a successful conclusion. The centre, which was opened in 1955 at the Cité des Apprentis Libanais, Hazmieh, under the direction of Dr J. Craft, WHO consultant for the programme, contains physiotherapy and hydrotherapy rooms and a prosthetic workshop, for all of which the equipment was supplied by UNICEF.

Physiotherapy and hydrotherapy were started in October 1955 under the supervision

[1] This 40-page study served as a background document at a WHO seminar on health education in Africa, held in Dakar, French West Africa, in March 1957. Copies may be obtained from the WHO Regional Office for Africa, Brazzaville, French Equatorial Africa.

of a WHO physiotherapist, Miss C. G. Johnson, and within a few months over 40 children were attending the centre for treatment each day, while 200 more were on a waiting-list. In the course of the programme, regular demonstrations of physiotherapy techniques and the art of muscle-testing in lower-neuron disease were held for final-year students from the American University and the French Faculty of Medicine, Beirut. At the end of 1956, a formal eighteen-month training course in physiotherapy, sponsored by the French Faculty of Medicine, was started at the centre. Training in the manufacture of orthopaedic devices was given to local personnel by Mr M. Tournepiche, the WHO prosthetic technician.

Wide interest was aroused by the programme, and at the beginning of 1957 a second rehabilitation centre—attached to the American University—was established in Beirut with the collaboration of the WHO physiotherapist. When the WHO/UNICEF programme concluded in June 1957, both centres were operating to capacity and the demand for their services had grown to such an extent that the Lebanese Ministry of Health was planning to open further centres at the St George and Khoury Saade Hospitals, Beirut.

Nursing training in the Seychelles and Tunis

WHO undertook in 1954 to assist the Government of the Seychelles in the training of public health nurses, and the organization of a public health nursing service. This task was achieved last year when a team of six trained nurses took over responsibility for all public health nursing in the islands.

This team was trained by a WHO public health nurse—Miss Birgitte Hauglund—and is directed by a senior public health nurse, who spent four months in the Federation of Malaya, under a WHO fellowship, to gain further experience in supervision, administration, organization and teaching. Two courses were given, each lasting for nine months and combining theory and practical work. As a preliminary, a sample survey was conducted in 468 houses to assess the needs for domiciliary nursing and to enable the WHO public health nurse to become familiar with the way of living, customs and beliefs of the people. The curriculum of the courses was based on: the health needs of the community; the characteristics of the population; the personal and professional status of the students; and generally accepted public health nursing activities.

The programme of the Seychelles public health nursing service comprises: maternal health (ante- and post-natal care); infant and pre-school health; school health; tuberculosis control; venereal-disease control; control of other communicable diseases; home nursing; and health education. Public health nursing districts have been established, and a field practice manual has been compiled by the members of the team. A substantial part of the equipment for the public health nursing service has been supplied by WHO, including nursing kits, film-strips, reference books, scales for schools and child health clinics, vision charts, etc.

* * *

Impelled by the need to recruit and train auxiliary personnel for the implementation of national public health programmes, the Government of Tunisia called on WHO to render some assistance in the training of nurses and nursing aides. Accordingly, two nurse educators were sent to Tunisia in September 1955.

Activities were centred in the Government nursing school in Tunis, which was to act as a kind of model for the other two Government schools in Sousse and Sfax. A comprehensive three-year course embracing the principles and practice of nursing was established. Bedside teaching was introduced, and under the guidance of the two educators, local nursing tutors instructed first- and second-year students in the techniques of their future profession. Practical teaching at all times stressed the preventive and social aspects of nursing.

Recruitment was considered an important feature of the project. The two educators were in personal contact with the principals of secondary and technical schools, among

which a revised nursing recruitment prospectus was widely circulated. In addition, the Ministry of Health set up a stand devoted to nursing activities in the Tunis Trade Fair. As a result, the proportion of Tunisian candidates for the nursing course rose considerably.

In December 1955, the Ministry of Health decided to modify the preparatory year of nursing training, established three months before, into a course for nursing aides. The WHO nurse educators helped to organize this course, the curriculum of which included an introduction to theoretical anatomy, physiology, hygiene, general pathology, pharmacy, and child care, accompanied by practical work. Assistance was also given to the organization of a midwifery course, which included teaching principles and advice on preventive aspects.

Composting of organic wastes

Rapid progress has been made during the past few years in the processing of human excreta and other organic wastes, so that they may be used as fertilizers without presenting a danger to public health. The World Health Organization, which published a monograph on this subject in 1956,[1] is at present helping the Japanese Government to develop a prototype composting plant, at Kobe City, for the treatment of both human excreta and urban refuse.

The plant is designed to hasten the process whereby complex organic substances are broken down by aerobic decomposition into simpler and more stable compounds for use as plant nutrients. Decomposition is accelerated by grinding the organic material so as to expose greater areas to aeration, and by using forced aeration to supply the oxygen necessary for fermentation.

A pilot plant, which was constructed early in 1955 and remained in operation until July 1956, provided valuable information which was taken into account in the construction of the full-size plant. The latter is designed to take 25 tons of refuse and 10 tons of night-soil per day. The plant has undergone continual revision, based on operating experiences, and further revisions are planned before its design is accepted as final. So far only refuse has been processed, but when the design and operational procedures have been further improved, it is planned to process night-soil as well. Final costs cannot yet be determined, but it is expected that they will be no higher than those of other, slower and more complicated methods of disposing of organic wastes. In fact, in speed and economy, the procedures developed in Kobe City are believed to represent a considerable advance on the composting techniques hitherto employed.

[1] Gotaas, Harold B. (1956) *Composting*, Geneva (*World Health Organization: Monograph Series*, No. 31)

People and Places

Yaws campaign in Sierra Leone

Dr P. H. Maury went to Sierra Leone at the end of March to take up the post of WHO Medical Officer attached to the WHO/UNICEF-assisted yaws campaign which has now successfully covered one of the country's three provinces.

Dr Maury, who studied medicine at the University of Paris, holds diplomas in bacteriology and hygiene and has carried out post-graduate research in dermatology and venereology. For the past three years he has been in charge of the WHO-assisted campaign against syphilis in Morocco.

Health education

Mr Urban Nelson has been assigned by WHO to advise the Government of Burma on health education activities, including the training of personnel and the development of health education in schools.

Mr Nelson has served as City Health Educator for the Metropolitan Vancouver Health Committee, British Columbia, Canada, and as Public Health Educator with the British Columbia Department of Health.

Training of sanitary inspectors

In connexion with a WHO-assisted environmental sanitation project now in progress in the Philippines,

the Government has prepared a long-range sanitation programme which will require the recruitment and training of several hundred sanitary inspectors over the next five years. A general plan of training has been prepared by Professor Earnest Boyce, WHO consultant, and will be put into effect by Mr Gerard C. Murphy, of Ireland, who is going to Manila in June as WHO sanitarian.

Mr Murphy holds certificates in sanitary science from University College and the Institute of Science and Technology, Dublin, and a diploma from the Royal Institute of Hygiene and Public Health, London. He has been active in organizing the training of health inspectors in Ireland, and has been a member of the Irish Health Inspectors' Training Committee since 1953.

Malariologist for North Borneo

WHO, UNICEF and the United Nations Technical Assistance Board are helping the Government of North Borneo to train antimalaria workers and to carry out a malaria control programme.

Dr Melencio Santa María, a malariologist attached to the Division of Malaria of the Philippine Department of Health, has been appointed WHO Medical Officer for this project. A graduate of the Faculty of Medicine, University of Santo Tomás, Manila, Dr Santa María has received special training from the United States Public Health Service, and has also studied modern malaria eradication techniques in Guatemala, El Salvador, Mexico, Venezuela, and Jamaica, under WHO auspices.

Malaria survey in Ghana

Dr Ignace Vincke, of Belgium, has gone to Ghana, on behalf of WHO, to carry out an entomological and malariological survey as a preliminary to possible antimalaria action.

Dr Vincke has had almost thirty years' experience of malaria work in the Belgian Congo, and has made important contributions to malaria research. In 1956, he was WHO consultant on the UNICEF/WHO government mission which toured all the malaria projects in the French territories of Africa and made recommendations for their future conduct.

Development of epidemiological services

For the past two years, an epidemiological unit attached to the Central Fever Hospital in Colombo, Ceylon, has been engaged in the study of disease prevalence in the country. The unit advises the other branches of the Ceylon Medical Service on matters relating to epidemiology, and trains undergraduate and post-graduate students in epidemiological methods.

Dr Josip Falisevac, Assistant Professor of the Medical Faculty and Head of Department of the Fever Hospital, University of Zagreb, Yugoslavia, has gone to Ceylon, on behalf of WHO, to assist the Government in this work and in the development of the country's epidemiological services in general. Dr Falisevac was educated at the University of Zagreb and has also spent some time at the Park Fever Hospital and the Central Public Health Laboratory, London, and at the London School of Hygiene and Tropical Medicine.

Sanitary engineering courses

Professor Lindon J. Murphy, of the United States, will join the staff of the Faculty of Engineering, University of Alexandria, Egypt, as WHO Visiting Professor of Sanitary Engineering on 1 June 1958. His duties will include the continuation of specialized courses leading to a university degree, which were started by Professor Harvey Wilke in 1956, and the development of post-graduate courses in advanced sanitary engineering. In addition to his university work, he will organize and give refresher courses for graduate engineers already in government service.

A graduate of Iowa State College, Professor Murphy holds advanced degrees in sanitary engineering, and is in charge of undergraduate and post-graduate sanitary engineering studies at the University of Missouri. He has also acted as consultant on sanitary engineering programmes in Germany and the Philippines.

Regional appointments

Dr Henry Richards has been appointed Public Health Administrator in the WHO Regional Office for South-East Asia. His duties will include the planning, co-ordination and supervision of public health projects in the countries of the Region. A specialist in public health and tropical medicine, Dr Richards is a former Deputy Director and Director of Health Services in the Sudan. More recently he has been engaged in the development of public health services in Ghana.

Dr Salwa Khuri-Otaqui has been appointed Maternal and Child Health Adviser in the WHO Regional Office for the Eastern Mediterranean. A graduate of the American University, Beirut, Dr Khuri was awarded a WHO fellowship for advanced training in England and Scotland in 1952. She has been serving for some years as Senior Medical Officer in charge of maternal and child health services with the United Nations Relief and Works Agency for Palestine Refugees, and was responsible for the planning of the WHO seminar on maternal and child health held in Cairo in November-December 1957.

Review of WHO Publications

An International Nomenclature of Yaws Lesions, by C. J. Hackett, Geneva, 1957 (*World Health Organization: Monograph Series*, No. 36), 103 pages. Price: £1, $4.00, or Sw. fr. 12. Also available in French and Spanish.

As explained in the introduction to this recent monograph, the lack of a generally recognized nomenclature of yaws lesions during the past half-century has produced much confusion. This has of late become more apparent as widespread yaws control activities have gathered momentum on an international scale. The readiness of countries to pool public health experience and material resources, together with the evolution of techniques for mass treatment campaigns, was greatly stimulated by the appearance of a new and effective remedy for yaws in long-acting penicillin. It was quickly realized, however, that these practical developments had outstripped what may be regarded as a fundamental tool in the knowledge of any disease—an agreed terminology.

Innumerable synonyms—of purely local origin (yaws trash), incorporating some outmoded diagnostic theory (mother yaw, daughter yaw), simply descriptive (" ghoul " hand, *pianides lichénoïdes*, crab yaws) or sometimes merely a vague term indiscriminately applied (yaws ulcer)—led to inaccurate reporting of the disease. Moreover, the difficulty of determining the order of appearance of lesions in the course of the disease was further complicated because latency and relapsing lesions made certain manifestations liable to be incorrectly attributed to particular stages of the disease.

These and other problems of diagnosis, aggravated by the confused nomenclature, were encountered when, in 1949-50, national yaws control campaigns with WHO and UNICEF collaboration were started in Haiti, Indonesia, the Philippines, and Thailand. In 1951, three members of the treponematoses control project in Indonesia prepared, as a provisional guide for field workers, a liberally illustrated monograph,[1] which attempted to relate some synonyms for the various skin manifestations of the disease to a simple clinical description. Over the past five years, however, much additional knowledge has been accumulated, so that the nomenclature now published may be regarded as superseding the earlier one in the *Atlas of Framboesia*.

In 1952, at the First International Symposium on Yaws Control in Bangkok, a classification of yaws lesions into nine groups was outlined. This was subsequently approved, with minor modifications, by the WHO Expert Committee on Venereal Infections and Treponematoses meeting in London later the same year.[2] More recently, a simple classification of yaws patients has been established for general use in mass campaigns.[3] The relationship of the nomenclature of yaws lesions now published to the earlier classification into nine groups and to the classification of yaws patients for mass campaigns is illustrated in an annex to the monograph.

The development of the nomenclature presented in this monograph has been the responsibility of several bodies with the co-ordination of the Venereal Diseases and Treponematoses Section, WHO. In its fourth report, which appeared in 1953, the WHO Expert Committee on Venereal Infections and Treponematoses recommended:

" that WHO take steps to establish through a corresponding study-group suitable standard nomenclature applicable for clinical and scientific purposes in the study of yaws . . . "[4]

[1] Hill, K. R., Kodijat, R. & Sardadi, M. (1951) *Atlas of framboesia*, Geneva (*World Health Organization: Monograph Series*, No. 5)

[2] *Wld Hlth Org. techn. Rep. Ser.*, 1953, **63**, 33

[3] Hackett, C. J. & Guthe, T. (1956) *Bull. Wld Hlth Org.*, **15**, 869

[4] *Wld Hlth Org. techn. Rep. Ser.*, 1953, **63**, 34

Such a group of experts came into being in 1955, when 18 persons with practical experience of yaws from 16 different countries responded to a questionnaire prepared by the Venereal Diseases and Treponematoses Section of WHO and accompanied by 181 photographs of characteristic lesions. The replies, together with the available literature on yaws terminology, were studied in WHO and a report was prepared. This was considered by a small working-party elected by the participants in the International Conference on Yaws Control, which was held at Enugu, Nigeria, in November 1955. A revised version of this report was then recirculated to the original group of experts, to the working-party, to all participants in the Conference, and to all members of the WHO Expert Panel on Venereal Infections and Treponematoses for further review. The replies received from this last inquiry have been taken into consideration as far as possible in the preparation of the recently published monograph.

Thus the text of this monograph has been drawn from the opinions of many past and present authorities on yaws from many countries. The illustrations of the lesions have been carefully selected from African material; they should contribute to a clearer recognition of the manifestations of the disease. It is hoped that this publication will be of practical value both for training in yaws campaigns and for general teaching in tropical medicine and communicable diseases.

Bulletin of the World Health Organization, 1958, Volume 18, Number 3 (pages 275-480)

This issue of the Bulletin opens with two articles forming part of a series of studies on the laboratory diagnosis of various diseases, which, it is hoped, will eventually be revised and published in monograph form. The first of these articles, by W. Burrows and R. Pollitzer, concerns the laboratory diagnosis of cholera, while, in the second, John E. Blair deals with the laboratory diagnosis of staphylococcal infections. An effort has been made to ensure that the diagnostic methods recommended in these studies are as internationally representative as possible by submitting them to a number of experts from different countries.

The growth of the insecticide resistance problem throughout the world between July 1956 and November 1957, and the developments in research on the subject during the same period are reviewed by A. W. A. Brown. A problem which could become an equally serious threat to the control of disease—that of untoward reactions to penicillin administration—is discussed by O. Idsöe and Ping-Nan Wang in a study on penicillin reactions in Taiwan, which can be considered as a " potentially penicillin-sensitized country ". That evidence for an increase in the incidence of such reactions is at present inconclusive, however, is shown in a note by R. R. Willcox, who analyses replies to a WHO questionnaire on the subject.

The first part of a report on an important WHO-assisted pilot project for the control of bilharziasis japonica in the island of Leyte, Philippines, is contributed by T. P. Pesigan and co-workers. In addition to a detailed review of the epidemiological situation on the island in respect of bilharziasis and other common helminthic infections, this paper includes an account of the techniques adopted by the control team, a section on the natural history and public health significance of bilharziasis, and an assessment of the relative roles of human and other hosts in the transmission of the disease.

Finally, notes are included on the following subjects : yaws in Brazil (Ulysses Motta de Aquino); the effect of numbers and age on the susceptibility of mosquitos to DDT (G. Raffaele, A. Coluzzi & J. de Zulueta); virus content of brains and submaxillary glands of animals suspected of having died of rabies (N. Veeraraghavan, A. Balasubramanian & R. Rangaswami); psychomotor development in African children (M. Geber & R.F.A. Dean); and water-supplies and latrines in Egyptian villages (Harold Shipman et al.). The list of contents appears in the advertising section at the end of this issue of the Chronicle.

* Comm.: W.H.O. (Geneva) 1958, 11, 6, p. 215)

BULLETIN

DE L'ORGANISATION MONDIALE DE LA SANTÉ

OF THE WORLD HEALTH ORGANIZATION

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Laboratory diagnosis of staphylococcal infections — *John E. Blair.*

The insecticide-resistance problem: a review of developments in 1956 and 1957 — *A. W. A. Brown.*

Penicillin-sensitivity reactions in Taiwan — *O. Idsöe & Ping-Nan Wang.*

Studies on *Schistosoma japonicum* infection in the Philippines: 1. General considerations and epidemiology — *T. P. Pesigan, M. Farooq, N. G. Hairston, J. J. Jauregui, E. G. Garcia, A. T. Santos, B. C. Santos & A. A. Besa.*

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Penicillin reactions: analysis of a WHO questionnaire — *R. R. Willcox.*

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Observations on the effect of numbers and age on the susceptibility of mosquitos to DDT — *G. Raffaele, A. Coluzzi & J. de Zulueta.*

Virus content of brains and submaxillary glands and occurrence of Negri bodies in animals suspected of having died of natural rabies infection — *N. Veeraraghavan, A. Balasubramanian & R. Rangaswami.*

Psychomotor development in African children: the effects of social class and the need for improved tests — *M. Geber & R. F. A. Dean.*

Report on a survey of water-supplies and latrines in certain Egyptian villages — *Harold Shipman, Mohammed Agamieh, M. Roushdy Ibrahim & Abdel Mawla M. Abdel Mawla.*

Vol. 18, No. 3 (1958), 206 pages **10/- $2.00 Fr. s. 6.—**